QUIZZLE - Content-Based Quiz Generation

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ABSTRACT

Quizzle is a project aimed at automatically generating quizzes from text documents, text queries or description of topics. It involves natural language processing, machine learning techniques and information retrieval techniques to analyze the content and generate questions related to it. It will also have the capability of marking students based on the answers given in the quiz.

The project can be divided into several steps: preprocessing, text analysis, question generation, answer generation and answer correction.

Quizzle has many practical applications, such as educational materials creation, online training programs, and online assessments. It can also provide personalized learning experiences for students by generating quizzes based on their learning level and progress.

ACM Reference Format:

Ishaan Marwah, Mohammad Sufyan Azam, Abhishek Jha, Aamleen Ahmed, Jai Singh, and Vaibhav Bhatt. 2018. QUIZZLE - Content-Based Quiz Generation. In *Proceedings of Make sure to enter the correct conference title from your rights confirmation emai (Conference acronym 'XX).* ACM, New York, NY, USA, 3 pages. https://doi.org/XXXXXXX.XXXXXXX

Conference acronym 'XX, June 03–05, 2018, Woodstock, NY

ACM ISBN 978-1-4503-XXXX-X/18/06…$15.00
https://doi.org/XXXXXXX.XXXXXXX

1 PROBLEM DEFINITION

In the academic setting a lot of professors have to go through the burden of preparing quizzes and exams for the class. In the same setting, a similar problem is faced by the students, who are confused about the possible questions that can be framed from the material taught in the class. Students have to constantly ask people who have done the courses before to give them the previous year quizzes. If the course is being offered for the first time then it is a very big

problem for both the instructor and the students because there are no previous year quizzes available for both of them.
The main problem is to somehow generate a quiz from the material that is given to the students or the topics told to the students.

We try to develop a solution where the user gives a document or some keywords or a text and the solution generates a quiz with a given format for the user. The format of the quiz can be selected by the user.

2 IMPORTANCE OF PROBLEM

There are several reason because of which the problem of content based quiz generation is very useful. Automated quiz generation is becoming increasingly important for educators, trainers, and content creators due to its ability to save time, provide personalized learning experiences, standardize quality, increase engagement, and provide valuable data on student performance. It can be used to identify areas of weakness and improve teaching methods to better meet the needs of students.
To be more clear about the importance of the problem, we generated a google form to survey a set of academic individuals and recorded their responses. The link to the google form is here: User survey for quizzle

3 RELATED WORK AND EXISTING PROBLEMS

On searching the internet, we can find a ton of applications and websites that claim to do content based quiz. We tested a number of these technological solutions and found a lot of issues in them. Some of the websites we used are QuizGecko, Quillions, Questgen, etc.
The most important problems in creating a successful and effective quiz are the quality of questions, relevance of questions, ambiguity of questions, diversity of questions, and accuracy of answers. Quality of questions is essential to ensure that the questions are well-written, properly formatted, and appropriate for the intended audience. Relevance of questions should be relevant to the content of the text document, and ambiguity of questions must be clear and unambiguous. Diversity of questions is important to keep the quiz engaging and prevent it from becoming repetitive. Accuracy of answers is critical to the success of the quiz, as incorrect answers can lead to frustration and mistrust, while accurate answers can increase engagement and build trust. All these problems were found in one or more of testing websites. Above that many of the websites required a huge amount of words to generate a quiz(somewhere around 200-1000 words). One more major problem was that none of them provided the option to generate quizzes from lecture material directly and user is required to paste some text into the website for generating the quiz. A lot of them did not have quiz generation based on the difficulty level which resulted in either too difficult quizzes or too easy quizzes.
We also found many research papers but many of them were not in practice. So, we can confidently say that there are a lot of problems in the technology dealing with content based quiz generation.

4 TECHNIQUES AND ALGORITHMS THAT WE PLAN TO USE

We plan to use various techniques and algorithms like machine learning models and algorithms, Deep learning models, Natural language processing models, Information retrieval techniques and knowledge graphs. We will also try to incorporate the ideas that we study from various research papers to make Quizzle more user friendly.

5 LITERATURE REVIEW

(1) Adaptive Quiz Generation Using Thompson Sampling by Fuhua Lin: This paper helps us understand how to implement personalised learning by incorporating a technique called thompson sampling. Thompson sampling is a Bayesian

learning algorithm that will help to improve the system's accuracy and efficiency.

(2) Knowledge Questions from Knowledge Graphs by Seyler: They propose an end-to-end approach to automatically generate quiz-style knowledge questions from a knowledge graph, using historical data from the Jeopardy! quiz show and a semantically annotated Web-scale document collection. Experiments demonstrate the viability of the approach.
(3) Automated Exam Question Generator using Genetic Algorithm by rahim et al
(4) Automated Quiz Generator Amit Bongir , Vahida Attar , and Ramanand Janardhanan
(5) Computational Intelligence Framework for Automatic Quiz Question Generation Akhil Killawala, Igor Khokhlov, Leon Reznik
(6) Personalized Automatic Quiz Generation Based on Proficiency Level Estimation Yi-Ting Huanga*, Meng Chang Chenb , Yeali S. Sun
(7) Automatic Generation and Delivery of Multiple-Choice Math Quizzes Ana Paula Tom´as and Jos´e Paulo Leal
(8)

6 OUR NEW IDEAS AND CONTRIBUTIONS

After seeing a lot of existing technologies available on the internet, we finally thought of many ideas that have not yet been implemented as technology. So, we plan to add the following features into **Quizzle**, so that it is better than all of the existing technologies:

Improving the accuracy of question generation, giving more independence to users by allowing them to give lecture slides to generate content along with large texts, allowing users to generate quizzes with just some names of the topics without any actual content, giving users the options to increase or decrease the difficulty of quizzes and by providing an option for the professors to grade the quizzes using technology. We will also try to make Quizzle more user friendly by incorporating the suggestions that we get from the people involved in academic activities.